British Columbia Geological Survey annual program review 2025-2026

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Abstract

Headquartered in Victoria, the British Columbia Geological Survey generates geoscience knowledge and data to inform land use and resource management decisions, and to support the growth of British Columbia as a competitive jurisdiction for mineral exploration. Geoscience outreach and public engagement are core functions of the Survey. Given intersecting and diverse interests about mineral resource development in the province, the Survey engagement program provides unbiased geoscience information to British Columbians to balance exploration and mining, environmental and heritage concerns, and economic realities. There continues to be an increased demand for geoscience information needed to guide land-use decisions and co-management of mineral resources by increased delivery of Mineral Lands Assessment reports that evaluate the significance of mineral resources in an area and the likelihood of mineral exploration and mining continuing in the future. These reports are aided by renewed mineral potential maps that also serve mineral exploration by indicating areas that are more likely and less likely to host mineralization.

The Cordilleran Geoscience Section conducts field, laboratory, and office-based research including bedrock and surficial geology mapping programs, regional geochemical surveys, and targeted mineral deposit studies. Critical minerals continued to be a major theme for the Survey in 2025. One stream of projects evaluates the availability of critical minerals to be added to production as co-products or byproducts in the short term. A second stream uses foundational mapping, geochronology, geochemistry, and geophysics to focus on longer term goals to identify new deposits and to encourage investment in under-explored critical mineral systems. The Resource Information Section is responsible for developing and updating provincial geoscience databases and disseminating data online through our geospatial web service (MapPlace). The Section is also responsible for reviewing mineral assessment reports, compiling mineral occurrences, archiving exploration technical documents, and updating mineral resource inventory data. To improve efficiency in data management, the Survey continues to modernize its information systems as part of the British Columbia geoscience Spatial Data Infrastructure (BCgSDI). The Mineral Development Office (MDO) is the Vancouver base of the Survey. It provides investment intelligence to government and global business and publishes the annual Mining and Exploration in British Columbia overview volume.

Keywords: Public geoscience, geology, information management, mineral exploration, engagement

1. Introduction

The British Columbia Geological Survey (BCGS, the Survey), a branch in the Mines Competitiveness and Authorizations Division of the British Columbia Ministry of Mining and Critical Minerals, has provided public geoscience services since 1895. The BCGS provides objective, reliable, evidence-based geoscience to many modern societal issues centred on the Earth sciences. Credible unbiased geoscience is of value for the exploration and mining of critical minerals, building relationships with Indigenous Peoples, and informing everyone living in the province about geoscience-related issues. Headquartered in Victoria, the Survey generates and disseminates public geoscience information that supports effective mineral exploration, sound land use management, and responsible governance. The Survey is the primary repository for provincial geoscience data and knowledge. Maps, reports, and databases are freely available online and are public resources for Indigenous groups, local communities, the minerals industry, public safety agencies, environmental scientists, research organizations, and other government agencies. Current research programs and publications (Figs. 1, 2) continue to define the geological evolution and mineral resources of the province, generating knowledge and data to support decisions that balance economic, environmental, and community interests. Virtually all Survey activities contribute to the Pan-Canadian Geoscience Strategy, a federal, provincial, and territorial collaboration that articulates the common needs and goals of geoscience organizations in Canada (Hickin, 2026).

The BCGS consists of three sections: 1) Cordilleran Geoscience; 2) Resource Information; and 3) the Mineral Development Office. The Cordilleran Geoscience Section generates new knowledge through field, laboratory, and office-based research activities including geological mapping programs, regional geochemical surveys, and targeted geological and mineral deposit studies. The Cordilleran Geoscience Section also curates the provincial sample archive

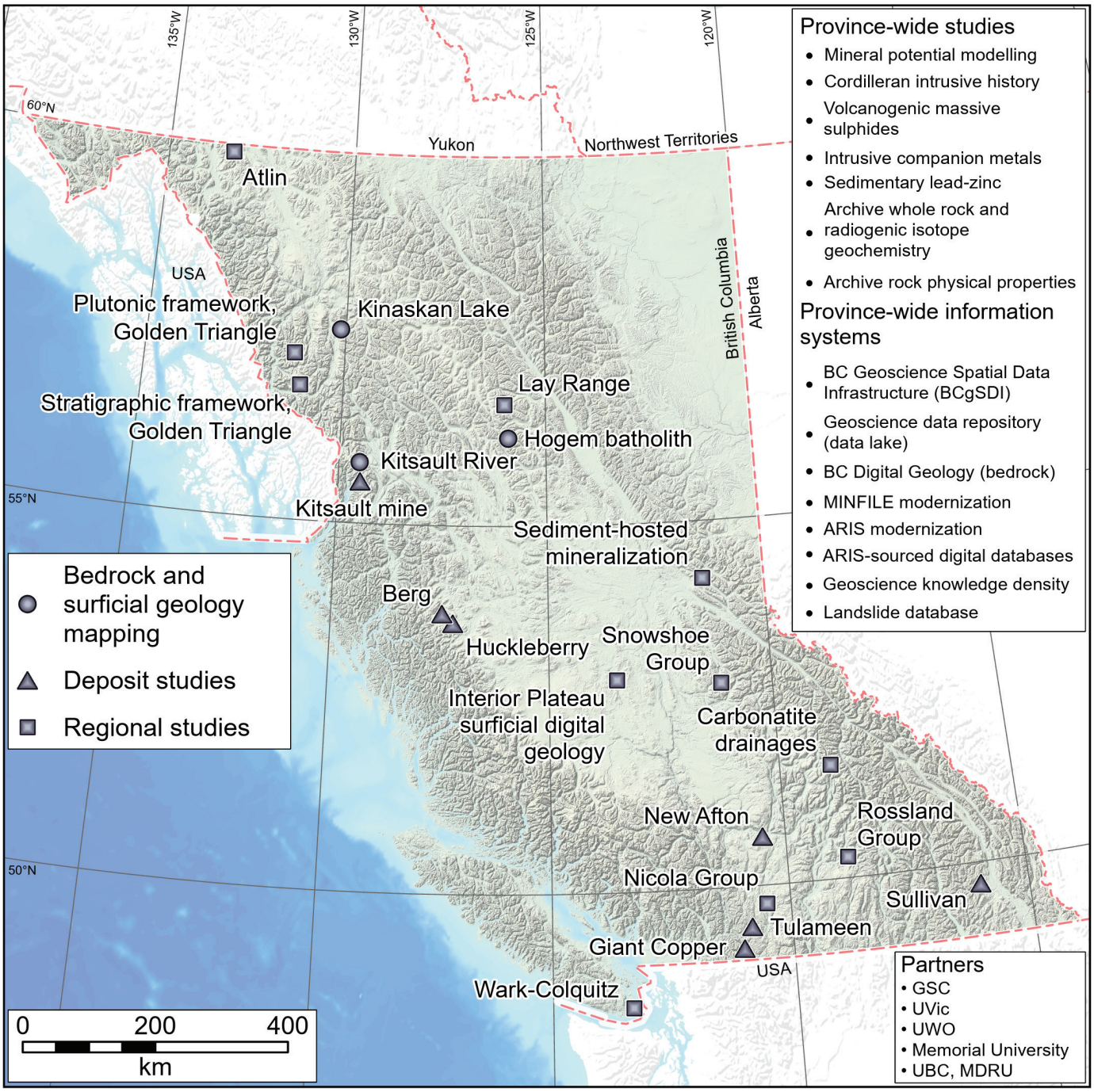
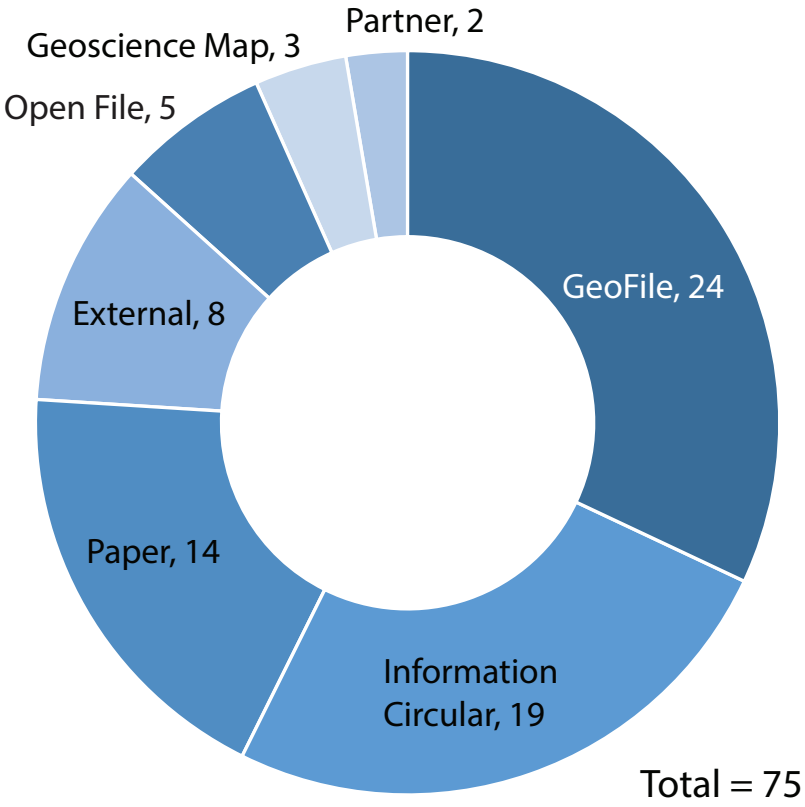


Fig. 1. British Columbia Geological Survey projects in 2025.

samples, enabling the Survey to re-examine legacy specimens as analytical techniques evolve. The Resource Information Section is responsible for developing and updating provincial geoscience databases and disseminating data online through our geospatial web service (MapPlace). The Resource Information Section is also responsible for reviewing mineral assessment reports, compiling mineral occurrences, archiving exploration technical documents, and updating mineral resource inventory data. The Mineral Development Office (MDO) is the Vancouver base of the Survey and provides investment intelligence to government and global business. The MDO is staffed by a group of Regional Geologists who, stationed in exploration centres across the province, track mineral exploration activities and provide geoscience expertise in their regions. The MDO publishes the annual Mining and Exploration in British Columbia overview volume (Clarke et al., 2026).



Papers*: This series is reserved for reviews and final thematic or regional works. Geological Fieldwork, our annual review of field activities and current research, is released as the first Paper of each year.

Geoscience Maps: This series is the BCGS vehicle for publishing final maps.

Open Files: These maps and reports present the interim results of ongoing research, particularly mapping projects.

GeoFiles: These publications enable rapid release of extensive data tables from ongoing geochemical, geochronologic, and geophysical work. As such, they serve the same function as data repositories provided by many journals, providing immediate access to raw data from specific projects.

Information Circulars*: These publications provide accessible geoscience information to a broad audience in government, industry, and the general public. Included in the Information Circular series is the annual Provincial Overview of Exploration and Mining in British Columbia. Starting in 2026, the volume will be released as the second in the Paper series, with the title Mining and Exploration in British Columbia.

Contributions to partner publications: This category includes reports, maps, and other products published by another agency such as the Geological Survey of Canada or Geoscience BC, but have received contributions from British Columbia Geological Survey staff.

External publications: These are contributions to the peer reviewed literature and published in a recognized national or international scientific journal.

*The count refers to the total number of articles.

Fig. 2. Type and numbers of publication produced by the British Columbia Geological Survey in 2025.

2. Critical minerals

Critical minerals continue to be a major theme for the Survey. In 2025-2026, the Survey advanced new multi-year projects to address knowledge gaps and gain insights into the mineral systems that contain critical minerals, the origin, age, and geographic distribution of mineralized rocks, and the spatial distribution of critical minerals within ore bodies (Fig. 1). One stream of projects examines the mineral systems that host significant deposits and mines, past and present. These projects are assessing if critical minerals could conceivably be added to production as co-products or byproducts in the short term. The workflow developed by the BCGS to support this stream is described in Ootes et al. (2026a) with examples from the historical Sullivan lead-zinc-silver deposit (Fig. 3).

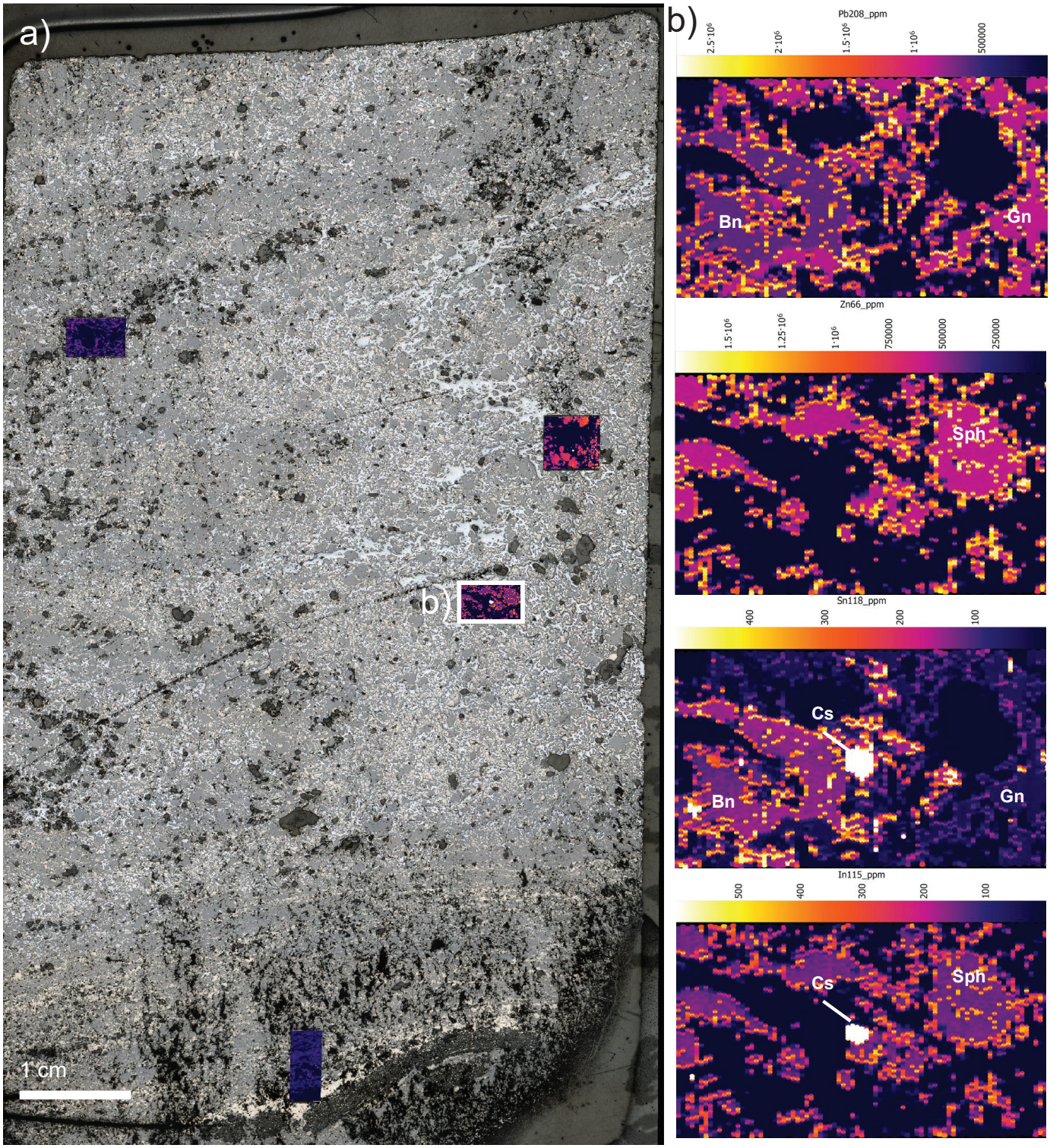


Fig. 3. a) Thin section photomicrograph of the past-producing Sullivan mine 'Main band' (reflected light). The four coloured boxes denote locations of laser ablation-inductively coupled-plasma mass spectrometry (LA-ICP-MS) maps. **b)** Examples of elemental distribution of one of these maps. From top to bottom are elemental distributions on Pb^{208}, Zn^{66}, Sn^{118}, and In^{115}. The circular white mineral in the Sn and In maps is cassiterite. Colour ramps are in parts per million (ppm). See Ootes et al. (2026a).

Additional projects from this stream include selected porphyry deposit studies in the Golden Triangle (Lawley et al., 2025) and specific deposit studies such as Schaft Creek, Huckleberry, Berg, Mount Polley, and New Afton (Graham et al., 2025, 2026; Bain et al., 2026).

A second stream focuses on the longer term to identify new deposits and to encourage investment in under-explored critical mineral systems. These projects include foundational mapping, geochronology, geochemistry, and geophysics. Some of these studies were regional, such as work in the Golden Triangle focused on better understanding the intrusive (Campbell et al., 2026) and stratigraphic (van Straaten, 2026) frameworks that control mineralization and a project that examined volcanogenic massive sulphide (VMS), porphyry, and epithermal deposits in the Kitsault area (Miller et al., 2025a, b). In the eastern part of the province, Rukhlov et al. (2026) took a multi-analytical approach to test exploration tools (Rukhlov et al., 2024, 2025a) that use stream-sediment samples to fingerprint upstream carbonatite-hosted niobium, tantalum, rare earth element (REE), and other critical mineral deposits. Many projects are province wide in scope, such as: 1) developing a modernized magmatic framework for critical mineral-bearing intrusive systems using high-precision age and isotopic tracer data to establish the age, emplacement setting, and geographic distribution of both fertile and barren intrusions (Ootes and Wall, 2024); 2) re-analyzing archived samples using modern whole-rock, trace element, and isotopic methods to understand the geological settings important for mineralization (British Columbia Geological Survey, 2025a; Rukhlov et al., 2025b); 3) measuring physical properties of archived rock samples; 4) mineral potential modelling of critical mineral-bearing systems (Wearmouth et al., 2024a, b); 5) examining critical minerals in volcanogenic massive sulphide (VMS) deposits (Wei et al., 2026); 6) examining critical minerals in deposits related to sedimentary rocks (Graham et al., 2025); 7) digitizing assessment reports and creating databases to enable easy extraction of critical mineral occurrences that may have been overlooked in original work (Fortin and Silva, 2025, 2026); and 8) creating a geoscience data repository (data lake) of historical records to enable machine learning and artificial intelligence interrogation for unrecognized critical mineral-bearing mineral occurrences.

3. Engagement

Public engagement is an important theme for the Survey because geoscience literacy helps British Columbians understand how geoscience underpins economic development, climate change adaptation, and public safety. Strengthening communication and outreach makes geoscience data and concepts more accessible to the public, policymakers, stakeholders, and rightsholders, thus supporting informed decisions that balance resource development with environmental, cultural, and economic priorities. BCGS efforts also emphasize inclusive engagement with Indigenous communities and diverse audiences to foster shared knowledge and responsible management of geological resources in the province.

The Survey's public engagement program provides unbiased geological information to address the varied interests concerning mineral resource development. By connecting Indigenous Peoples, local communities, government, industry, and the broader public to provincial geology and mineral resources, the program supports land-use planning, co-management, and relationship building. Bacha (2026) outlines the developing data sharing initiatives that the Survey is using to build trust and exchange knowledge with Indigenous communities.

BCGS engagement activities in 2025-2026 included providing information to and interacting with Indigenous Peoples, elected officials, students, and the general public. The BCGS took part in Mining Day at the Legislature, an event sponsored by the British Columbia Mining Association (MABC), where the Survey provided experiential learning opportunities to the sitting government, opposition members, and their staff (Fig. 4). The Survey participated in the annual Discovery Day at the Association of Mineral Exploration Roundup Convention in Vancouver, and Geodiversity Fest at the Royal British Columbia Museum in Victoria. BCGS staff

Fig. 4. Engagement with government. David Eby, Premier, and Jagrup Brar, Minister of Mining and Critical Minerals, Mining Day at the Legislature, May 2025.

are also active in the professional geoscience community by organizing and presenting technical talks, delivering guest lectures at universities, co-supervising graduate student projects, and being on organizing committees of conferences and professional groups.

Collaboration between the Citxw Nlaka'pamux Assembly (CNA) of south-central British Columbia and the Survey led to a successful short course and fieldtrip in which CNA staff visited active exploration sites and experienced first-hand how geological research is carried out, and Survey and industry geologists learned about CNA values, worldviews, and understandings of nature (Bacha, 2025). At the invitation of Tl'azt'en Nation, the BCGS and the Geological Survey of Canada (GSC) held an in-person meeting in December 2025 to review the available public geoscience information for their territory and discuss how it can be accessed and used (Fig. 5). Discussions also covered critical minerals and mineral exploration projects in their territory.

Fig. 5. Engagement with Tl'azt'en Nation, central interior of British Columbia.

4. Land-use planning and mineral potential modelling

Land-use decisions and co-management of natural resources require high-quality information, including geological data. These data are necessary to establish the mineral interests in an area and to evaluate potential economic opportunities. The Survey is meeting a heightened demand for these data by increased delivery of intra- and inter-Ministry Mineral Lands Assessment and industry intelligence reports. In support of four ongoing land-use planning consultations with Indigenous Peoples, the BCGS used previous mineral potential modelling work (Wearmouth, 2024a, b) to generate a series of more consumable publications (British Columbia Geological Survey, 2025b, c, d, e).

BCGS co-organized a pan-Canadian mineral potential modelling workshop where federal, provincial, territorial and international practitioners met to foster and coordinate innovation, discuss past, present, and future methods, explore emerging tools in artificial intelligence and geospatial analysis, and begin addressing shared challenges such as data integration, gaps in data coverage, model uncertainty and interpretation, and communicating results to non-specialists (British Columbia Geological Survey, 2025f). The Survey is now expanding its mineral potential modelling program to extend across the entire province and include additional mineral systems.

5. Partnerships

Partnerships continue to be an effective way for the Survey to lever its resources. Working with other industry, other geoscience agencies, and universities, these partnerships extend across a wide spectrum of collaboration, all with the aim of enhancing public geoscience.

BCGS partnerships with industry are key to support mineral exploration and mining in the province. The Survey has nine agreements and memoranda of understanding with companies ranging from grassroots explorers to major operating mines. These agreements allow for site access by BCGS project geologists, logistical support, exchange of knowledge, sample collection and analyses, and release of data. The partnerships provide companies with improved regional frameworks for their data, and the Survey gets access to resources (e.g., drill core and ore concentrate samples) that would be difficult to independently collect.

The Geological Survey of Canada (GSC) and BCGS continue to benefit from strong ties. One joint project is examining rock physical properties from archived samples. Analyses include density, magnetic susceptibility, and porosity measurements. These physical properties provide the link between remote geophysical surveys and in-situ bedrock, thus improving geophysical and geological interpretations. The physical properties database now incorporates more than 24,000 samples with the intention of reaching a total of 29,000 by April 2027. This large dataset will enhance the accuracy of geophysical inversions and provide a classification tool to help assess bedrock fertility remotely.

The Critical Minerals Geoscience and Data (CMGD) program is a Natural Resources Canada initiative launched in 2023 to provide essential knowledge and data to support the development of Canada's critical minerals resources. BCGS was successful in getting CMGD funding to complete four projects by April 2027. One project (Rukhlov et al., 2026) builds on work by Rukhlov et al. (2024) to evaluate areas prospective for rare metals such as niobium, tantalum, and rare earth elements (REE) through re-analysis of archived stream-sediment samples (Rukhlov et al., 2025a). Another project (Fortin and Silva, 2025) is directed at populating a province-wide drillhole database by extracting information from assessment reports submitted by the mineral exploration industry. This project will generate a provincially maintained database of drillholes and assays, which will enable explorationists to minimize duplicating work. A third CMGD-funded project focuses on understanding the temporal and spatial relation between intrusions and mineralized systems across the province. Many mineralized systems formed during relatively narrow geological time windows; thus high-precision

geochronology is needed to increase exploration success (e.g., Ootes and Wall, 2024; British Columbia Geological Survey, 2025a). This project will triple the amount of modern, high-precision U-Pb zircon age data using chemical abrasion isotope dilution mass spectrometry (CA-TIMS) and associated trace elements and isotopes (hafnium, oxygen). The fourth CMGD project is a geoscience data repository (data lake) initiative for the Canadian Cordillera. Under this project, British Columbia is collaborating with Yukon to develop a new, comprehensive, integrated database that will contain scanned historical data with optical character recognition (OCR) to enable machine learning applications search for unrecognized critical mineral-bearing occurrences contained in assessment reports. To date, approximately 6500 documents have been scanned and indexed.

As co-investigator, BCGS and collaborators are part of two National Science and Engineering Research Council (NSERC) Alliance Grants. These grants enable research activities that advance Canadian knowledge, models, processes, tools, and technologies to support data-driven decisions of domestic critical mineral value chains and grow Canadian expertise. One grant, focusing on the mineralogy and genesis of critical mineral-bearing volcanogenic massive sulphide (VMS) deposits, the enrichment of critical elements in these deposits, and the processes that lead to enrichment, was awarded to Memorial University of Newfoundland. The work, reported on by Piercey et al. (2025), Pietruska et al. (2026), and Wei et al. (2026), provide information on critical element mineral residence, siting, and textures. The end goal of this project will be to provide refined descriptive, genetic, exploration, and development models for critical metal-bearing VMS deposits and in so doing provide an updated metallogenic model for this deposit type. Complementing ongoing BCGS activities (Graham et al., 2025; Northcote, 2025; Ootes et al., 2026a), a second grant led by the Mineral Deposit Research Unit (MDRU), University of British Columbia and focuses on sedimentary exhalative (SEDEX) and Mississippi Valley Type (MVT) mineral systems across the Selwyn Basin (southeastern Yukon), Kechika trough (northeastern British Columbia), and Purcell Basin (southeastern British Columbia).

Collaborations between BCGS and university researchers have always been an important and productive activity of the Survey. Since 2003, the Survey has had a formal partnership with the School of Earth and Ocean Science, University of Victoria. In 2026, BCGS and Western University (London, Ontario) entered a formal research agreement to continue research collaborations critical companion metals occurrences in porphyries (Bain et al., 2026; Graham et al., 2026) and skarn mineral deposits (Bain et al., 2025). The Survey also has informal collaborations with students and faculty at University of the Fraser Valley, Simon Fraser University, The University of British Columbia, British Columbia Institute of Technology, The University of British Columbia-Okanagan, Thompson Rivers University, University of Alberta, University of Calgary, University of Manitoba, Queen's University, Darthmouth University, Colorado School of Mines, and Laoshan Laboratory (China).

6. Cordilleran Geoscience Section

Cordilleran Section geologists collect geoscience data through single and multi-year field-based programs complemented by laboratory and office-based studies. These programs include regional-scale mapping, mineral deposit studies, and developing new mineral exploration methods. Section expertise encompasses tectonics, structural geology, stratigraphy, petrology, metallogeny, critical minerals, geochemistry, Quaternary and surficial geology, and geohazards.

6.1. Framework geoscience

Framework geoscience projects better our understanding of provincial geology and can be regional in extent or focus on detailed mapping with ancillary geochemical and geochronologic work.

Field mapping is the most fundamental form of geological research and remains core to BCGS activities. Miller et al. (2025a) released a preliminary bedrock geology map of the Kitsault River map area in northwestern BC; the final map release is anticipated for summer 2026. Höy and DeFields (2025) released the results of 1:50,000-bedrock mapping in the Lightning Peak area in southeastern BC. Ferbey and Elia (2025a, b, 2026a, b) released a series of four 1:50,000-scale surficial geology maps of the northern Hogem batholith areas in north central BC (Fig. 6) that are companions to the bedrock geology by Ootes et al. (2020). In 2025, the Survey started work on a digital compilation of surficial geology for the Interior Plateau, where thick packages of glacial drift can add complexity to mineral exploration, land-use planning, forestry, and infrastructure projects. Elia and Ferbey (2026) describe how they selected, ranked, and compiled source maps, present methods for converting surficial data to a uniform standard, and provide details about how the compilations may be used. Initial data release for the central portion of the Interior Plateau is anticipated for summer 2026.

Fig. 6. Mesilinka intrusive suite (Middle Jurassic to Early Cretaceous), exposed in the glacially carved U-shaped Klakring Creek valley. View towards the northeast. See Ferbey and Elia (2026a).

In 2025-2026, the Survey continued work to establish a regional framework for Paleozoic to Eocene intrusions (Campbell et al., 2026) and Triassic-Jurassic stratigraphy (van Straaten, 2026) in the Golden Triangle. Campbell et al. (2026) investigated rocks of the Texas Creek plutonic suite (Early Jurassic) in the Bronson corridor near Iskut River (Fig. 7) and in the Salmon Glacier area to understand their potential control on Au (±Ag) and Au-Cu mineralization. Complementing this work, van Straaten (2026) is examining stratigraphic relationships of Triassic-Jurassic units to better constrain the tectonic and metallogenic evolution of the region, which hosts numerous porphyry, epithermal, and VMS deposits (Fig. 8). Mihalynuk et al. (2024) released a 1:50,000-scale map of the western Gladys Lake area near Atlin. Based in part from samples collected during the last few years, Zagorevski et al. (2026a) used radiolarian (Fig. 9) and conodont biostratigraphy to re-evaluate terranes in the northern Cordillera of British Columbia and Yukon, suggesting that Mesozoic rock units are more widespread than previously recognized and potentially represent a disrupted overlap assemblage. Cordey et al. (2025) released a supporting radiolaria dataset; Zagorevski et al. (2026b) compiled radiolarian and conodont data.

Fig 7. Texas Creek plutonic suite quartz monzonite to granodiorite unit (EJTgd), Lehto pluton cut by a biotite-phyric mafic dike. See Campbell et al. (2026).

Fig. 8. Angular unconformity between Stuhini Group sedimentary rocks (Upper Triassic) and the Jack Formation of the lower Hazelton Group (uppermost Triassic to Lower Jurassic) in the Golden Triangle region of northwestern British Columbia. See van Straaten (2026).

Fig. 9. Well-bedded radiolaria-bearing grey chert with orange argillaceous interbeds, Atlin area. See Zagorevski et al. (2026a).

In the north-central part of the province, Ferri and Friedman (2026a) provided Permian U-Pb zircon ages from Lay Range assemblage and Cassiar terrane felsic metavolcanic rocks (Fig. 10). Lithogeochemical data (whole rock, trace, and rare earth element) for the Lay Range assemblage are consistent with eruption in an arc setting. Farther south, Ferri and Friedman (2026b) provide U-Pb zircon and geochemical data on Permian intrusive bodies (Fig. 11) in the Snowshoe Group.

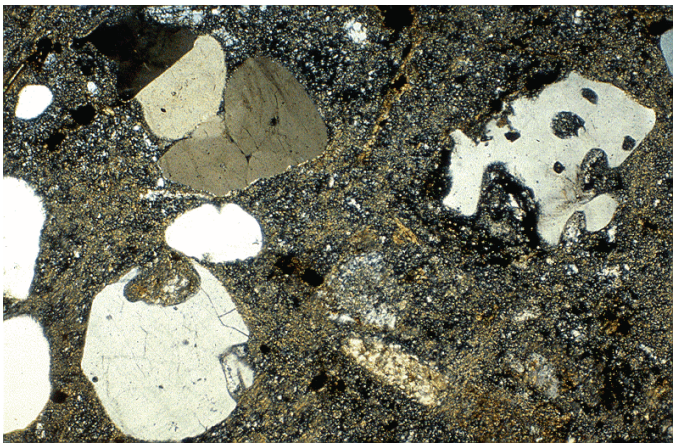


Fig. 10. Photomicrograph of Gilliland tuff from the Wasi Lake area with resorbed quartz grains; crossed polarizers, width of view ~10 mm. See Ferri and Friedman (2026a).

Fig. 11. Pillowed mafic volcanic rocks from the Harveys Ridge succession ~1.5 km southwest of Frank Creek. See Ferri and Friedman (2026b).

The results are consistent with a Permian back-arc along the western margin of Ancestral North America. Lithogeochemical analysis of mafic volcanic rocks in the Snowshoe Group are predominantly alkali basalts indicating a within-plate setting, but some contain basalt to alkali basalt with both E-MORB and arc signatures, and others are alkali basalts displaying within-plate abundances. Southern Quesnel terrane, which contains most of the currently producing mines in the province remains an area of active mineral exploration and of particular focus for the Survey. U-Pb zircon results from Nicola Group samples taken during regional mapping were summarized by Mihalynuk et al. (2025a), $^{40}Ar/^{39}Ar$ results were presented by Gabites and Mihalynuk (2025) and Orchard et al. (2025) determined that conodonts faunas from the Nicola Group near Merritt identify the lower-middle Norian boundary. These publications provide the source data of the time of deposition and maximum deposition age for refinements of key stratigraphic intervals in the Nicola Group proposed by Mihalynuk et al. (2025b).

Ootes et al. (2026b) use detrital zircon U-Pb data to reassess the distribution of rock units at the transition between Quesnellia and Ancestral North America (Fig. 12). In contrast to previous models, the data indicate that the Nicola, Rossland, and Slocan groups formed independently of continental North America as it is currently positioned. Using the new data Ootes et al. (2026b) propose a novel tectonic model that envisages deposition in an east-facing forearc above a west-dipping subduction zone.

In the Southwest Region, Mihalynuk and Gabites (2026) confirmed an Oligocene age of ca. 24 Ma for polymetallic porphyry-related breccias at the Giant Copper deposit using $^{40}Ar/^{39}Ar$ biotite data. Nelson (2026) provides a precise U-Pb zircon date from deformed and post-kinematic intrusive samples of the Wark-Colquitz complex in downtown Victoria (Fig. 13). Both are ca. 193 Ma and agree within error, indicating that the voluminous plutonism and possibly ductile deformation in the complex were short-lived, and coincided in timing with a

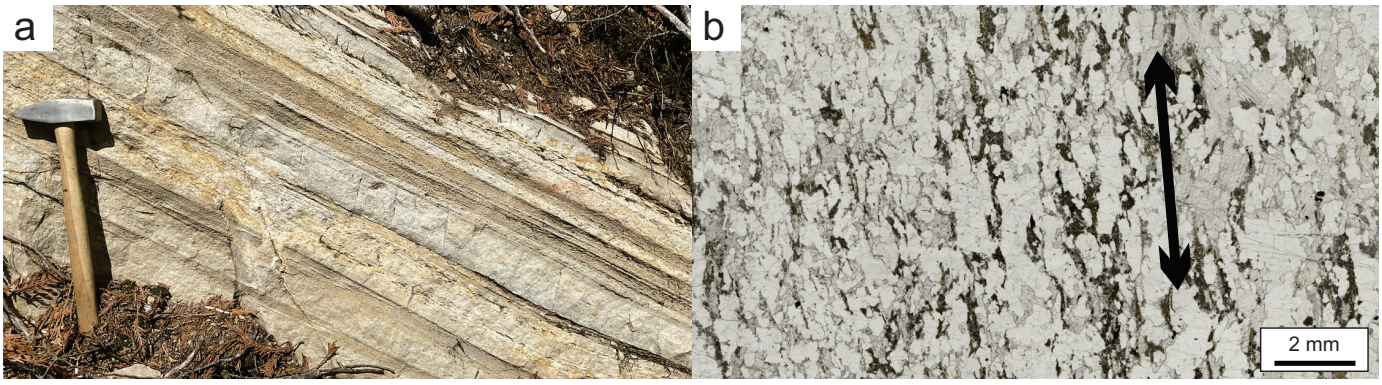


Fig. 12. a) Chase Formation quartzite with layering that is tectonic rather than depositional. **b)** Thin section photomicrograph (plane polarized light) illustrating recrystallized quartz ribbons that define a lineation (parallel to the arrow), supporting that this rock unit is no longer a sedimentary rock but a mylonite in which primary depositional features were transposed into a tectonic fabric during ductile strain. See Ootes et al. (2026b).

major pulse of the Island Intrusions, which are thought to have fed the Bonanza arc. This supports the interpretation that the Wark-Colquitz complex is an exhumed deep-crustal portion of Wrangellia that exposes the roots of the Triassic-Jurassic Bonanza magmatic arc.

Fig. 13. Well-layered Wark-Colquitz gneiss at Mount Tolmie Park, Victoria. See Nelson (2026).

6.2. Economic geology and geochemistry

BCGS economic geology and geochemistry projects focus on better understanding the distribution and origin of precious, base, and critical metals in British Columbia. Northcote (2025) reviewed the inventory of SEDEX, MVT, and related lead-zinc occurrences in the province. Autochthonous and parautochthonous terranes in the eastern part of the Canadian Cordillera in British Columbia are among the few global settings prospective for sedimentary-hosted lead-zinc deposits. These deposits contain most of the provincial zinc inventory and have the potential to host critical-mineral companion metals. Graham and Ootes (2025) investigated the bulk-rock geochemical data for 40 mineralized samples retrieved from the British Columbia Geological Survey rock archive from SEDEX and related deposits and mineral occurrences in Belt-Purcell basin, south Kootenay arc, Monashee-Shuswap region, Germansen Landing area, and the Kechika trough. To support the current priority on critical minerals and metals research, Ootes et al. (2026a) developed a workflow to identify mineralogic controls on critical companion metal distribution using archived samples from the historical Sullivan lead-zinc-silver deposit as an example.

Porphyry deposits are major global sources of copper and molybdenum, both on the 2024 version of the Canadian critical minerals list (NRCan, 2024). These deposits may also contain minor amounts of companion metals that are on the critical minerals lists of many jurisdictions and that could conceivably be byproducts of primary commodity mining (e.g., bismuth, the platinum group elements, rhenium, tellurium, and tungsten). Graham et al. (2025, 2026) examined how the geochemistry of critical companion metals in porphyry deposits in the province relates to the deportment of critical companion metals. Lawley et al. (2025) presented lithogeochemical and detailed mineralogic and trace element mapping analyses from several porphyry copper-gold projects in the Golden Triangle and the Brucejack epithermal gold-silver project to consider the origins of mineralization and the deportment of critical materials (e.g., antimony, bismuth, palladium, tellurium) that could conceivably be recovered as companion metals. Levering its partnerships with industry (see Section 5), the BCGS obtained ore concentrate samples from six operating porphyry mines in British Columbia and analyzed them for presence of critical minerals not currently being recovered. Analysis of these samples, along with work by Lawley et al. (2025), Graham (2025, 2026), Bain et al. (2026), will improve our understanding of critical minerals in the processing chain from mineralized rock to ore concentrate.

Piercey et al. (2025), Wei et al. (2026) and Pietruszka et al. (2026) continued their research partnership with the BCGS studying the mineralogy and genesis of critical mineral-bearing VMS deposits, the enrichment of critical elements in these deposits, and the processes that lead to enrichment. They used a suite of quantitative analysis of major and minor elements using electron probe microanalyzer (EPMA), determination of trace elements using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) and scanning electron microscopy-mineral liberation analysis (SEM-MLA) techniques to examine critical metal concentrations and partitioning in mineral phases.

The British Columbia alkaline province, which extends along the length of the eastern part of Cordillera for at least 1000 km, was the focus of numerous studies. Carbonatites and related rock types host niobium-tantalum-rare earth elements (REE) deposits and are under-explored in the region. Rukhlov et al. (2026) used several techniques on stream-sediment samples to test the ‘carbonatite geochemical index’ (Rukhlov et al., 2024, 2025a), which was derived from a drainage study that considered pathfinders for niobium, rare earth element, and other critical minerals in carbonatites and related silica-undersaturated and alkaline silicate rocks. Rukhlov et al. (2026) concluded that indicator minerals identified in catchment basins with data from qualitative X-ray diffraction analysis, quantitative evaluation of minerals by scanning electron microscopy (QEMSCAN®), scanning electron microscopy-mineral liberation analysis (SEM-MLA), micro-X-ray fluorescence (μXRF), detrital zircon and apatite trace-element analysis, and U-Pb detrital zircon geochronology confirm the occurrence of carbonatites in bedrock upstream. Abdale et al. (2025) provided new U-Pb zircon ages and hafnium data from carbonatites and syenites in the Blue River area and Monashee complex of southeastern BC. They identified two distinct pulses of carbonatite

magmatism: Early Cambrian (ca. 505 Ma) associated with continental margin extension, and Upper Devonian (ca. 358 Ma) linked to back-arc extension. Further analysis by Abdale et al. (2026) of the integrated U-Th-Pb geochronology, textural observations, trace element analysis, and Pb isotope data from the Monashee complex was able to resolve timing of the initial magmatism activity and subsequent younger Jurassic hydrothermal processes.

The BCGS archive is home to rock, mineral, and geochemical samples collected from across the province (Rukhlov et al., 2023). These collections represent a valuable resource for public geoscience, supporting re-analysis using modern comprehensive and high-precision analytical methods for new geoscience initiatives. The British Columbia Geological Survey (2025a) released initial results of a province-wide geochemical re-analysis project, providing whole rock and mineral Sr-Nd-Hf-Pb and galena Pb isotopic data from about 1400 archive samples.

6.3. Thematic geoscience

In 2025-2026, the Cordilleran Section also advanced work on two thematic geoscience projects to understand the how geoscience information and landslide hazards are distributed across the province. Zhang et al. (2026) generated a series of geoscience knowledge density map, the first geospatial compilation of publicly available geoscience information footprints for British Columbia. These maps display the spatial distribution of bedrock and surficial map, thematic, geophysical, geochemical, geochronological, and mineral resource information and include a derivative cumulative density map that provides a first-order characterization of all geoscience information in the province. Maps depicting the spatial distribution of geoscience information are of value for establishing information needed for making land-use decisions, planning new projects, mineral potential modelling, and increasing public awareness of geoscience activities. Brideau et al. (2026a) released a publicly available preliminary Canadian Landslide Database which is a compilation of existing landslide inventories and new mapping. Version 13 of the database contains 28,000 national entries of which 14,520 are from British Columbia. Brideau et al. (2026b) highlights how, within the limitations of an ongoing work, the database fills a gap in our overall understanding of landslide processes and provides common baseline knowledge to local governments, practitioners, and researchers. It also provides interested parties with initial desktop-level information of known landslides in an area and helps to identify priorities for further work.

7. Resource Information Section

The British Columbia Geological Survey is the steward of all provincial public geoscience and mineral resource data. Through the Resource Information Section, the Survey preserves, archives, and provides free online access to information gathered for more than 130 years. Delivered through web portals and MapPlace, the BCGS geospatial web service, province-wide databases and web applications include: digital coverage of bedrock geology (BC Digital Geology); the assessment report index system (ARIS); the mineral inventory (MINFILE); coal information (COALFILE); geochronologic data; geochemical and geophysical surveys; and collections of previously unpublished private documents donated by government, universities, industry, and individuals (Property File).

The public-facing end of BCGS databases and web services have been well-received. Like at many public geoscience agencies however, the back end is a patchwork of legacy systems lacking a common interface, which resulted from rapid advancements in computing technology outpacing enterprise-wide system architecture design and integration standards (Cui et al., 2026). Consequently, the databases are a challenge to maintain, inefficient to update, and a significant impediment to delivering Survey programs and support machine learning and natural language processing. Addressing these problems, the Survey has initiated the BCgSDI (BC geoscience Spatial Data Infrastructure) project to modernize our databases and applications and bring them into an integrated system (Cui et al., 2026). The approach being used by the Survey offers a practical template for similar modernizations in other agencies, and development of the BCgSDI is an important contribution to the Pan Canadian Geoscience Strategy (see Hickin, 2026).

7.1. MapPlace

MapPlace is the Survey's geospatial web service that allows users to discover, visualize, search, and generate summary reports and maps from our databases. Easy access to geoscience maps and data is crucial for making informed decisions on mineral exploration, mining, environmental protection, and land-use management. MapPlace serves as a platform to facilitate data mining and analysis of geoscience information in the context of other data such as mineral titles, assessment reports, land ownership, public infrastructure, and topographic base maps. Some of the data layers and applications are specifically developed to enable research and analytics for mineral exploration.

7.2. ARIS assessment reports and database

Results of mineral exploration are submitted by industry as assessment reports to the government in compliance with the Mineral Tenure Act Regulation. After a one-year confidentiality period, the assessment reports become freely available to the public. ARIS contains more than 41,600 reports dating back to 1947. The Survey manages these reports in the Assessment Report Indexing System (ARIS) database, which has a web interface to search by location, mineral occurrence, commodities, claims, and work types. All the assessment reports are available online as PDF documents and more than 1000 contain data (e.g., geochemical analyses and geophysical surveys) in common digital data formats that can be readily used. New derivative products are being created by capturing data sourced in ARIS documents, including geochemical (Norris and Fortin, 2019; Fortin and Silva, 2026) and drillhole (Fortin and Silva, 2025) databases.

7.3. MINFILE mineral occurrence database

MINFILE is a database containing location, geological, and economic information for more than 16,200 mineral, coal, and industrial mineral mines, deposits, and occurrences in British Columbia. In addition to spatial and non-spatial search and visualization on MapPlace, a dedicated web interface is available to query the database and retrieve details such as geological setting, deposit type, mineralogy, age, commodity, host rock, resources, production, and information sources. Query results are available to download as summary reports, spreadsheets, and GIS data format in KML. MINFILE/pc is a portable extract of the MINFILE database with a built-in search interface and printable reports. The Survey has transformed part of the MINFILE mineral occurrence data to be compliant with the Open Geospatial Consortium (OGC) standard EarthResourceML Lite schema and mapped the contents using the vocabularies adopted by the International Union of Geological Sciences Commission for the Management and Application of Geoscience Information. The EarthResourceML Lite-compliant mineral occurrence data is accessible via the OneGeology portal and open standard-based interface such as the OGC Web Mapping Service (WMS) and Web Feature Service (WFS) specification. These OGC compliant web services are available to be part of the Canadian adoption of the EarthResourceML Lite standard with other Canadian jurisdictions.

7.4. BC Digital Geology

The Survey offers province-wide digital coverage of bedrock geology including details from field mapping, with a typical regional compilation at a scale of 1:50,000. A geospatial frame data (GFD) model is used to simplify the compilation and integration of new regional mapping into the BC Digital Geology database (Cui, 2021). Bedrock geology is standardized with consistent stratigraphic coding, ages, and rock types to enable computations, and is available for download in GeoPackage and Esri shapefile formats. Customized bedrock geological maps and legends can be explored, and data downloaded as KML by spatial and non-spatial queries via MapPlace. The BCGS has transformed digital geology to the GeoSciML Lite schema and mapped the contents using the vocabularies adopted by the International Union of Geological Science Commission for the Management and Application of Geoscience Information.

7.5. Other databases

COALFILE includes a collection of assessment reports, dating back to 1900. Property File is a collection of spatially referenced archived reports, maps, photos, and technical notes documenting mineral exploration activities in British Columbia since the late 1800s. The provincial geochemical databases hold field and geochemical data from multi-media surveys by the Geological Survey of Canada, the BCGS, and Geoscience BC. The databases are updated regularly and contain results from the Regional Geochemical Survey program, till surveys, and lithogeochemical samples. As part of the Critical Minerals Geoscience and Data (CMGD) program (see above), the Survey is also creating a geoscience data repository (data lake) of historical records to enable machine learning and artificial intelligence interrogation of unrecognized critical mineral-bearing mineral occurrences.

8. Mineral Development Office (MDO)

Mining contributes greatly to the economy of British Columbia, and exploration is the backbone of mining. More than 1000 exploration and mining companies are headquartered in Vancouver. In addition, the exploration and mining industry is particularly important for northern communities and some Indigenous groups, employing more than 40,000 people. Between 2020 and 2024, the total value of mining production was $71.89 billion, and the exploration expenditure was $3.0 billion. For 2025, the forecast value of mine production is $16.42 billion, and the exploration expenditure is estimated at $750.9 million (Clarke et al., 2026).

The Mineral Development Office (MDO) is the Vancouver base of the British Columbia Geological Survey. Regional Geologists (Table 1) are part of the MDO and are stationed at exploration centres across the province (Smithers, Prince George, Kamloops, Vancouver) where they provide geoscience expertise and monitor local industry activities. Public geoscience is one of the principal enablers of grassroots mineral exploration, the backbone of mining. The MDO provides technical information and investment intelligence to global business, government, and Indigenous groups.

The Mineral Development Office serves mineral resource decision making by: linking exploration and mining companies to provincial mineral and coal information; conducting an annual expenditure and drilling survey to analyze short- and long-term industry trends (EY LLP, 2026); producing the annual Mining and Exploration volume, a summary of mining and exploration projects, activities, production and expenditures (Fig. 14; Clarke et al., 2026), responding to requests from government and Indigenous groups for mineral resource data needed for land-use planning and to support decision makers; and providing mineral resource, project, and technical data to government groups.

Table 1. British Columbia Regional Geologists.

Regional Geologist	Office	Region
Nate Corcoran	Smithers	Northwest
Hassan Heidarian	Prince George	Northeast and North Central
Cary Pothorin	Kamloops	South Central
BCGS	Cranbrook	Southeast
Bruce Northcote	Vancouver	Southwest

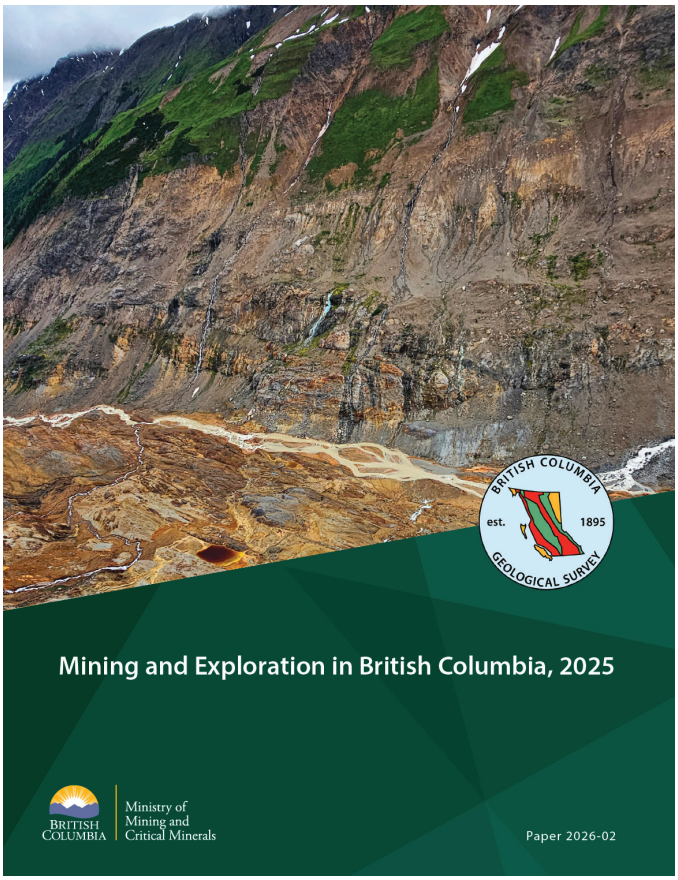


Fig. 14. Mining and Exploration in British Columbia annual volume. See Clarke et al. (2026).

9. Staffing

BCGS is currently staffed by 34 permanent employees (Fig. 15) but vacancies remain from retirements and departures. Building a strong pipeline of skilled geoscientists is needed to sustain Canada's resource development and energy transition and is one of the priority areas of the Pan Canadian Geoscience Strategy (Hickin, 2026). To help train the next generation of geoscientists, the Survey hires 8-12 seasonal or term employees each year, usually university students or recent graduates, to aid safe fieldwork or to assist in targeted projects (Fig. 16).

Fig. 15. British Columbia Geological Survey staff, 2025.

Fig. 16. Training the next generation. Project geologist and geoscience assistants leaving for a helicopter-supported bedrock mapping traverse.

BCGS had several personnel changes in 2025. Kaleigh Szponarski joined the Survey as geomatics specialist and Quinn Cunningham returned to the Survey for a two-year mineral deposits geoscience assistant position funded by Natural Resources Canada's Critical Minerals and Data (CMGD) program. David Zhang has joined the Survey on a one-year assignment as a geomatics specialist to provide leave cover. Di Tang and Ryan Grundy are now pursuing opportunities outside the Survey.

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